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Application Number	10/085,203	RECEIVED
Filing Date	February 27, 2002	APR 16 2004
First Named Inventor	Joseph A. Kwak	Technology Center 2600
Art Unit	2662	
Examiner Name	Saba Tsegaye	
Attorney Docket Number	I-2-0203.3US	

ENCLOSURES (Check all that apply)

<input checked="" type="checkbox"/> Fee Transmittal Form <input type="checkbox"/> Fee Attached <input type="checkbox"/> Amendment/Reply <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s) <input type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input type="checkbox"/> Information Disclosure Statement <input type="checkbox"/> Certified Copy of Priority Document(s) <input type="checkbox"/> Response to Missing Parts/ Incomplete Application <input type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53	<input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation <input type="checkbox"/> Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Request for Refund <input type="checkbox"/> CD, Number of CD(s) _____ <div style="border: 1px solid black; padding: 2px;">Remarks</div>	<input type="checkbox"/> After Allowance communication to Technology Center (TC) <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input checked="" type="checkbox"/> Appeal Communication to TC (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input type="checkbox"/> Other Enclosure(s) (please identify below):
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SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm or Individual name	Jeffrey M. Glabicki	Reg. No. 42,584
Signature		
Date	April 12, 2004	

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APR 14 2004

PTO/SB/17 (10-03)

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FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

 Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$ 330.00)

Complete if Known

Application Number	10/085,203
Filing Date	February 27, 2002
First Named Inventor	Joseph A. Kwak
Examiner Name	Saba Tsegaye
Art Unit	2662
Attorney Docket No.	I-2-0203.3US

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Technology Center 2600

METHOD OF PAYMENT (check all that apply)

 Check Credit card Money Order Other None
 Deposit Account:

Deposit Account Number	09-0435
Deposit Account Name	InterDigital Communications Corporation

The Director is authorized to: (check all that apply)

Charge fee(s) indicated below Credit any overpayments
 Charge any additional fee(s) or any underpayment of fee(s)
 Charge fee(s) indicated below, except for the filing fee to the above-identified deposit account.

FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
1001 770	2001 385	Utility filing fee	
1002 340	2002 170	Design filing fee	
1003 530	2003 265	Plant filing fee	
1004 770	2004 385	Reissue filing fee	
1005 160	2005 80	Provisional filing fee	
SUBTOTAL (1) (\$)			

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

Total Claims	Independent Claims	Multiple Dependent	Extra Claims	Fee from below	Fee Paid

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description
1202 18	2202 9	Claims in excess of 20
1201 86	2201 43	Independent claims in excess of 3
1203 290	2203 145	Multiple dependent claim, if not paid
1204 86	2204 43	** Reissue independent claims over original patent
1205 18	2205 9	** Reissue claims in excess of 20 and over original patent
SUBTOTAL (2) (\$)		

*or number previously paid, if greater; For Reissues, see above

3. ADDITIONAL FEES

Large Entity	Small Entity	Fee Description	Fee Paid
1051 130	2051 65	Surcharge - late filing fee or oath	
1052 50	2052 25	Surcharge - late provisional filing fee or cover sheet	
1053 130	1053 130	Non-English specification	
1812 2,520	1812 2,520	For filing a request for ex parte reexamination	
1804 920*	1804 920*	Requesting publication of SIR prior to Examiner action	
1805 1,840*	1805 1,840*	Requesting publication of SIR after Examiner action	
1251 110	2251 55	Extension for reply within first month	
1252 420	2252 210	Extension for reply within second month	
1253 950	2253 475	Extension for reply within third month	
1254 1,480	2254 740	Extension for reply within fourth month	
1255 2,010	2255 1,005	Extension for reply within fifth month	
1401 330	2401 165	Notice of Appeal	
1402 330	2402 165	Filing a brief in support of an appeal	330.00
1403 290	2403 145	Request for oral hearing	
1451 1,510	1451 1,510	Petition to institute a public use proceeding	
1452 110	2452 55	Petition to revive - unavoidable	
1453 1,330	2453 665	Petition to revive - unintentional	
1501 1,330	2501 665	Utility issue fee (or reissue)	
1502 480	2502 240	Design issue fee	
1503 640	2503 320	Plant issue fee	
1460 130	1460 130	Petitions to the Commissioner	
1807 50	1807 50	Processing fee under 37 CFR 1.17(q)	
1806 180	1806 180	Submission of Information Disclosure Stmt	
8021 40	8021 40	Recording each patent assignment per property (times number of properties)	
1809 770	2809 385	Filing a submission after final rejection (37 CFR 1.128(a))	
1810 770	2810 385	For each additional invention to be examined (37 CFR 1.128(b))	
1801 770	2801 385	Request for Continued Examination (RCE)	
1802 900	1802 900	Request for expedited examination of a design application	
Other fee (specify)			
*Reduced by Basic Filing Fee Paid		SUBTOTAL (3) (\$ 330.00)	

(Complete if applicable)

Name (Print/Type)	Jeffrey M. Glabicki	Registration No. (Attorney/Agent)	42,584	Telephone	215-568-6400
Signature				Date	April 12, 2004

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PATENT

#15

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE



In the **PATENT APPLICATION** of:

Joseph A. Kwak

Application No.: 10/085,203

Filed: February 27, 2002

For: IMPLEMENTING A PHYSICAL LAYER
AUTOMATIC REPEAT REQUEST
FOR A SUBSCRIBER UNIT

Group: 2662

Examiner: Saba Tsegaye

Our File: I-2-0203.3US

Date: April 12, 2004

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APR 16 2004

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APPEAL BRIEF

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Further to the February 12, 2004 Notice of Appeal, Applicant hereby submits this
Appeal Brief.

04/14/2004 SZEWDIE1 00000113 090435 10085203

01 FC:1402 330.00 DA



Applicant: Joseph A. Kwak
Application No.: 10/085,203

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(1) REAL PARTY IN INTEREST

The real party in interest is the assignee of record, InterDigital Technology Corporation.

(2) RELATED APPEALS AND INTERFERENCES

A Notice of Appeal was filed on February 12, 2004 for U.S. Patent Application No. 09/939,410 which is the parent of the present application. Other than that appeal no other appeals or interferences are known which will directly affect or be directly affected by or have a bearing on the Board's decision in the present appeal.

(3) STATUS OF THE CLAIMS

Claims 1-23 are the subject of this appeal and are attached in Appendix A. No other claims are pending. Claims 7, 8 and 10-12 are finally rejected under 35 U.S.C. §102(e), as being anticipated by U.S. Patent No. 6,208,663 (Schramm et al.). Claim 9 is finally rejected under 35 U.S.C. §103(a), as being unpatentable over Schramm et al. in view of U.S. Patent No. 6,128,276 (Agee). Claims 1, 2, 5 and 6 are finally rejected under 35 U.S.C. §103(a), as being unpatentable over U.S. Patent No. 6,529,561 (Sipola) in view of Schramm et al. Claims 13-15 and 21-23 are finally rejected under 35 U.S.C. §103(a), as being unpatentable over U.S. Patent No. 6,021,124 (Haartsen) in view of Schramm et al. Claims 18-20 are finally rejected under 35 U.S.C. §103(a), as being unpatentable over Haartsen in view of Schramm and further in view of Sipola. Claims 16 and 17 are finally rejected under 35 U.S.C. §103(a), as being unpatentable over Haartsen in view of Schramm et al. and further in view of U.S. Patent No. 6,522,650 (Yonge, III et al.). Claims 3 and 4 are finally rejected under 35 U.S.C. §103(a), as being unpatentable over Sipola in view of Schramm et al and further in view of Agee.

(4) STATUS OF THE AMENDMENTS

No Amendments were filed after the November 13, 2003 Final Action.

(5) SUMMARY OF THE INVENTION

A subscriber unit implements a physical layer automatic repeat request. A transmitter of the subscriber unit has a physical layer transmitter for receiving data (such as blocks 34a of Figure 3, see, for instance, paragraph [0028]), formatting the received data into packets (such as N-Channel Sequencer 36 of Figure 3 see, for instance, paragraph [0028]). Each packet has a particular encoding/data modulation (such as AMC Control 26C and Physical Layer ARQ Xmitter 26A of Figure 1B, see, for instance, paragraph [0024]). The transmitter transmits the packets and retransmits packets in response to failure to receive a corresponding acknowledgment for a given packet (See, for instance, paragraph [0019]).

An acknowledgment receiver receives the corresponding acknowledgment (such as ACK Receiver 26B). An adaptive modulation and coding controller collects retransmission statistics and adjusts the particular data encoding/modulation using the collected statistics (such as by AMC Control 26C of Figure 1B, see, for instance, paragraph [0021]). If the collected statistics indicate a low number of retransmissions, a higher capacity encoding/modulation scheme is selected as the particular encoding/data modulation (See, for instance, paragraph [0021]). If the collected retransmission statistics indicate a high number of retransmissions, a lower capacity encoding/data modulation scheme is selected as the particular encoding/data modulation (See, for instance, paragraph [0021]).

The subscriber unit also comprises a receiver having a physical layer receiver for demodulating the packets (such as Physical Layer ARQ Receiver 16A, see, for instance, paragraph [0017]). A combiner/decoder buffers, decodes and detects packet errors (such as Hybrid ARQ Decoders 50 of Figure 3, see, for instance, paragraph [0029]). An acknowledgment generator generates an acknowledgment for each packet if that packet has

an acceptable error rate (such as ACK Xmitter 54 of Figure 3, see, for instance, paragraph [0029]).

(6) ISSUES

- (1) Do claims 7, 8 and 10-12 meet the requirements of 35 U.S.C. §102(e), as not being anticipated by U.S. Patent No. 6,208,663 (Schramm et al.)?
- (2) Does claim 9 meet the requirements of 35 U.S.C. §103(a), as being unpatentable over Schramm et al. in view of U.S. Patent No. 6,128,276 (Agee)?
- (3) Do claims 1, 2, 5 and 6 meet the requirements of 35 U.S.C. §103(a), as being unpatentable over U.S. Patent No. 6,529,561 (Sipola) in view of Schramm et al.?
- (4) Do claims 13-15 and 21-23 meet the requirements of 35 U.S.C. §103(a), as being unpatentable over U.S. Patent No. 6,021,124 (Haartsen) in view of Schramm et al.?
- (5) Do claims 18-20 meet the requirements of 35 U.S.C. §103(a), as being unpatentable over Haartsen in view of Schramm and further in view of Sipola?
- (6) Do claims 16 and 17 meet the requirements of 35 U.S.C. §103(a), as being unpatentable over Haartsen in view of Schramm et al. and further in view of U.S. Patent No. 6,522,650 (Yonge, III et al.)?
- (7) Do claims 3 and 4 meet the requirements of 35 U.S.C. §103(a), as being unpatentable over Sipola in view of Schramm et al and further in view of Agee?

(7) GROUPING OF CLAIMS

The claims on appeal consist of four groups. Claims 1, 2, 6-8 and 12-20 are in group one and claim 1 is the representative claim. Claims 3, 9 and 21 are in Group 2 and claim 3 is

the representative claim. Claims 4, 10 and 22 are in Group 3 and claim 4 is the representative claim. Claims 5, 11 and 23 are in Group 4 and claim 5 is the representative claim.

(8) ARGUMENT

Background

This application (U.S. Patent Application No. 10/085,203) was filed on February 27, 2002.

Group 1 (Claims 1, 2, 6-8 and 12-20):

Issue (1): Do claims 7, 8 and 10-12 meet the requirements of 35 U.S.C. §102(e), as not being anticipated by U.S. Patent No. 6,208,663 (Schramm et al.)?

Schramm et al. describes a change in FEC coding and/or modulation scheme at column 7, lines 1-12 as follows.

If the quality of the connection is not sufficient for the current FEC coding and/or modulation scheme, then RBS 22 will select an alternate scheme for retransmission processing, in this example QPSK modulation, which is designed to have improved noise and/or interference resistance. For example, RBS 22 can count the number of requests for retransmitted blocks and only use the alternative FEC coding and/or modulation scheme when the counted number of erroneously transmitted blocks exceeds some predetermined threshold. If desired, the alternative FEC coding and/or modulation scheme can be implemented each time a retransmitted block is requested, i.e., the case where the predetermined threshold is zero.

(Emphasis Added). Essentially, Schramm et al. discloses that after transmission of a block fails a specified number of times, the block is transmitted using an alternate scheme having improved noise and/or interference rejection. Applicants respectfully disagree that counting a number of failed attempts of retransmitting a given packet constitutes “collecting retransmission statistics.” Furthermore, the present invention adjusts to a higher capacity encoding/data modulation scheme in response to a low number of retransmission statistics.

The scheme of the present invention allows for the system to achieve an optimum encoding/data modulation scheme using retransmission statistics. Applying Schramm et al. to a low retransmission environment would result in either no change to the scheme (the threshold not being exceeded) or, ironically, to a lower capacity scheme (if a retransmission is required and the threshold is exceeded). Accordingly, Schramm et al. would never move to a higher capacity scheme based on acknowledgements or negative acknowledgements.

An argument was set forth that the resetting of the FEC/modulation scheme in Schramm is analogous to the lowering the modulation/coding scheme of the present invention. However, the present invention uses the retransmission statistics to adjust the encoding/modulation scheme. This is clearly different to resetting the scheme for each block of Schramm, which is performed automatically after a successful transmission.

With respect to issues 2-7, none of the additional references, Agee, Sipola, Haartsen and Yonge, III et al., cure this lack of Schramm's teaching. Accordingly, these claims meet the requirements of 35 U.S.C. §102(e) and 35 U.S.C. §103(a).

Group 2 (Claims 3, 9 and 21):

With respect to Group 2, Agee is cited as disclosing the Orthogonal Frequency Division Multiple Access (OFDMA) elements of the claims. Although Agee mentions OFDMA in passing in Columns 4 and 5, it does disclose nulling sub-channels or, in particular, the nulling of the sub-channels as the adjusting of the modulation and coding scheme as previously described in context with Group 1.

Group 3 (Claims 4, 10 and 22):

With respect to Group 3, Schramm is cited as disclosing the use of single carrier-frequency division equalization (SC-FDE). However, Schramm does not even mention SC-FDE, except that "the present invention is readily applied to all types of access

methodologies" at column 4, lines 51-53. Accordingly, Schramm does not even disclose an SC-FDE system.

Group 4 (Claims 5, 11 and 23):

With respect to Group 4, these claims recite using a fast feedback channel for the acknowledgements, which is not disclosed in Schramm et al. or the other cited references. The use of the fast feedback channel allows for fast acknowledgement and fast adaptation of the encoding/modulation scheme to the channel conditions as reflected by the fast accumulating retransmission statistics.

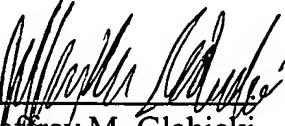
(9) CONCLUSION

For the reasons stated above, pending claims 1-23 meet the requirements 35 U.S.C. §102(a) and 35 U.S.C. §103(a). Accordingly, the final rejection should be reversed. After reversal, Applicant respectfully requests that the pending claims be passed to allowance.

Respectfully submitted,

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APPENDIX A
(PENDING CLAIMS OF U.S. PATENT APPLICATION NO. 10/085,203)

1. A subscriber unit implementing physical layer automatic repeat request, comprising:

a transmitter having:

a physical layer transmitter for receiving data, formatting the received data into packets, each packet having a particular encoding/data modulation, transmitting the packets, and retransmitting packets in response to failure to receive a corresponding acknowledgment for a given packet;

an acknowledgment receiver for receiving the corresponding acknowledgment; and

an adaptive modulation and coding controller for collecting retransmission statistics and adjusting the particular data encoding/modulation using the collected statistics; wherein if the collected statistics indicate a low number of retransmissions, a higher capacity encoding/modulation scheme is selected as the particular encoding/data modulation and if the collected retransmission statistics indicate a high number of retransmissions, a lower capacity encoding/data modulation scheme is selected as the particular encoding/data modulation; and

a receiver having:

a physical layer receiver for demodulating the packets;

a combiner/decoder for buffering, decoding and detecting packet errors; and

an acknowledgment generator for generating an acknowledgment for each packet if that packet has an acceptable error rate.

2. The subscriber unit of claim 1 wherein the particular encoding/data modulation is forward error correction (FEC).

3. The subscriber unit of claim 2 wherein the packets are transmitted using an orthogonal frequency division multiple access (OFDMA) air interface and the FEC

encoding/data modulation adjusting is performed in addition to selective nulling of subchannels in an OFDMA set.

4. The subscriber unit of claim 1 wherein the packets are transmitted using a single carrier having a frequency domain equalization (SC-FDE) air interface.

5. The subscriber unit of claim 1 whereby the subscriber unit uses a code division multiple access (CDMA) air interface and wherein the acknowledgments are transmitted on a fast feedback channel.

6. The subscriber unit of claim 1 whereby the acknowledgment generator transmits a negative acknowledgment if any packet has an unacceptable errorrate.

7. Physical automatic request repeat apparatus employed by a subscriber unit, comprising:

a transmitter having:

means for receiving data;

means for formatting the received data into packets for transmission, each packet having a particular encoding/data modulation;

means for transmitting the packets;

means for retransmitting a packet, if an acknowledgment for that packet is not received;

means for collecting retransmission statistics; and

means for adjusting each particular data modulation using the collected retransmission statistics; wherein if the collected statistics indicate a low number of retransmissions, a higher capacity encoding/modulation scheme is selected as the particular encoding/data modulation and if the collected retransmission statistics indicate a high number of

retransmissions, a lower capacity encoding/data modulation scheme is selected as the particular encoding/data modulation; and

a receiver having:

means for receiving packets;

means for decoding and error checking each received packet; and

means for generating an acknowledgment at the physical layer if that received packet has an acceptable error rate.

8. The subscriber unit apparatus of claim 7 wherein the particular encoding/data modulation is forward error correction (FEC).

9. The subscriber unit apparatus of claim 7 wherein the packets are transmitted using an orthogonal frequency division multiple access (OFDMA) air interface and the FEC encoding/data modulation adjusting is performed in addition to selective nulling of subchannels in an OFDMA set.

10. The subscriber unit apparatus of claim 7 wherein the packets are transmitted using a single carrier having frequency domain equalization (SC-FDE) air interface.

11. The subscriber unit apparatus of claim 7 wherein the acknowledgments are transmitted using a code division multiple access (CDMA) air interface on a fast feedback channel.

12. The subscriber unit apparatus of claim 7 whereby said means for generating generates a negative acknowledgment if a packet has an unacceptable error rate.

13. A subscriber unit for supporting broadband wireless communications comprising:

a sequencer having a queue for receiving data blocks from a communication network and for sequentially conveying packets to n transmitters;

n transmitters for transmitting said packets through a data channel;

n receivers for receiving return packets through said data channel; and

n hybrid ARQ decoders, each coupled with one of said n receivers;

whereby said n hybrid ARQ decoders have a feedback channel for transmitting an acknowledgment when a packet having an acceptable error rate has been received, and for releasing packets which have an acceptable error rate; whereby if a low number of retransmissions occurs, a higher capacity encoding/modulation scheme is selected to transmit said packets through the data channel and if a high number of retransmissions occur, a lower capacity encoding/data modulation scheme is selected to transmit said packets through the data channel.

14. The subscriber unit of claim 13 wherein said n signal transmitters each temporarily store a packet that has been transmitted in a buffer memory; whereby each of said n transmitters clear the stored packet in readiness for receipt of another block when an acknowledgement signal for the stored packet has been received at one of said n receivers.

15. The subscriber unit of claim 13 wherein said n transmitters each temporarily store a packet that has been transmitted in a buffer memory; whereby said n transmitters retransmits the packet temporarily stored in its buffer memory when an acknowledgement signal for the stored packet has not been received at one of said n receivers.

16. The subscriber unit of claim 13 wherein each of said n transmitters clears its buffer memory if an acknowledgement signal is not received after a maximum number of retransmissions.

17. The subscriber unit of claim 16 wherein the maximum number of retransmissions is an operator defined integer having a range from 1 to 8.

18. The subscriber unit of claim 13 wherein each of said n receivers combine a retransmitted packet with an original transmitted packet to facilitate error correction.

19. The subscriber unit of claim 13 wherein a transmitter failing to receive an acknowledge signal encodes the packet by employing a different encoding technique from an encoding technique employed in an original transmission of that packet.

20. The subscriber unit of claim 13 wherein each of the n transmitters employs turbo coding and each of the n decoders employ code combining of an original transmission and a retransmission to facilitate error correction.

21. The subscriber unit of claim 13 wherein the packets are transmitted using an orthogonal frequency division multiple access (OFDMA) air interface in which frequency subchannels in an OFDMA set may be selectively nulled.

22. The subscriber unit of claim 13 wherein the packets are transmitted using a single carrier having a frequency domain equalization (SC-FDE) air interface.

23. The subscriber unit of claim 13 wherein the acknowledgments are transmitted on a fast feedback channel using a code division multiple access (CDMA) air interface.